

REMARKS/ARGUMENTS

In the Office Action mailed August 23, 2007, claims 1-21 were rejected. In response, Applicant hereby requests reconsideration of the application in view of the amended claims and the below-provided remarks. No claims are added.

For reference, claims 1, 6, and 18 are amended. In particular, claim 1 is amended to refer to “a result from the first search” in order to clarify the antecedent basis of a claim term. Claim 6 is amended to correct a typographical error to clarify that the search-dependent processing, rather than the search-independent processing, uses a result from the search of the first stage memory unit and a result of the search-independent processing to produce a second search key. Claim 18 is amended to include a limitation related to the first and second stage processing elements of claim 19. As a result, claim 19 is canceled. Applicant respectfully submits that these amendments are supported by the subject matter of the originally filed application.

Response to Claim Rejections

Claims 12, 13, and 17 were rejected under 35 U.S.C. 102(e) as being anticipated by Kaganoi et al. (U.S. Pat. Pub. No. 2003/0012198, hereinafter Kaganoi). Additionally, claims 1-3, 6-9, 11, and 14-16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kaganoi in view of Kanakubo (U.S. Pat. No. 7,158,519, hereinafter Kanakubo). Additionally, claims 4, 5, and 10 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kaganoi in view of Kanakubo and further in view of Khanna et al. (U.S. Pat. No. 7,219,187, hereinafter Khanna). Additionally, claims 18-21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kaganoi in view of Khanna. However, Applicant respectfully submits that these claims are patentable over Kaganoi, Kanakubo, and Khanna for the reasons provided below. For convenience, Applicant’s remarks begin with a discussion of the rejection of claim 12 in order to generally follow the order of the rejections presented in the Office Action.

Independent Claim 12

Claim 12 recites “the first and second stage processing elements are configured to allow the second stage processing element to perform search-independent processing related to a packet in parallel with a search of the first stage memory unit, where the search is related to the same packet” (emphasis added).

In contrast, Kaganoi does not disclose performing search independent processing, as recited in the claim. Kaganoi merely describes a process to split an incoming packet into multiple cells for pipelined processing within a packet processing unit. In particular, the packet processing unit 10 includes several blocks to implement the pipelined process. Kaganoi, Fig. 1. The packet receiving circuit 11 receives a packet and splits the packet into multiple cells. Kaganoi, paragraph 34. Each cell is then, in turn, processed by the search key extracting circuit 12 to extract a search key from the packet. Kaganoi, paragraph 37. Using this extracted search key, the content addressable memory (CAM) 13 outputs a memory address. Kaganoi, paragraphs 37-38. The matching entry address receiving and associative data address transmitting circuit 14 then uses the memory address from the CAM to calculate a memory address of the associative data in the associative data memory 15. Kaganoi, paragraph 39. Using the memory address of the associative data in the associative data memory, the search result (associative data) receiving circuit 16 retrieves the associative data from the associative data memory. Kaganoi, paragraph 40. After the associative data corresponding to all of the cells of the packet are obtained, then the packet transmitting circuit 17 merges the cells together to reassemble and output a complete packet. Kaganoi, paragraph 41.

Hence, from the detailed description provided in Kaganoi, each stage of the pipelined process is described as being dependent on the previous stage. For example, the CAM 13 uses the search key extracted by the search key extracting circuit 12. The block 14 uses the memory address from the CAM 13 to calculate the memory address of the associative data memory 15. The block 16 retrieves the associative data from the associative data memory 15 based on the memory address calculated by the block 14. The block 17 uses the retrieved associative data to reassemble a complete packet. Thus, all of the pipeline stages require the results of the previous stage in order to begin processing data for the current cell. In this manner, Kaganoi merely describes search-

dependent processing because the processing of each stage is completely dependent on the processing results of the previous stage. Furthermore, Kaganoi does not describe any embodiments in which the processing of one stage might begin prior to completion of an earlier stage in the pipeline. Therefore, Kaganoi does not disclose search-independent processing because Kaganoi merely describes search-dependent processing.

Accordingly, Applicant respectfully submits that claim 12 is patentable over Kaganoi because Kaganoi does not disclose all of the limitations of the claim, including search-independent processing.

It should also be noted that the processing of different cells in different pipeline stages at the same time is not the same as search-independent processing, as recited within the context of the claim. While the processing of one cell may or may not depend on the processing of a previous cell (Kaganoi does not appear to disclose an implementation which might address this issue), the search-dependent processing described in Kaganoi requires that, for all cells, the processing of each cell within a pipeline stage is dependent on the results of the previous pipeline stage. Therefore, the description of pipelined processing of different cells of a packet nevertheless describes search-dependent processing because the processing of each cell at each stage is dependent on the processing results of a prior pipeline stage for the same cell.

Independent Claims 1, 6, and 18

Applicant respectfully asserts independent claims 1, 6, and 18 are also patentable over Kaganoi, whether alone or in combination with Kanakubo and/or Khanna, at least for similar reasons to those stated above in regard to the rejection of independent claim 12. The rejections of independent claims 1, 6, and 18 rely on the same reasoning that is traversed above in regard to the rejection of independent claim 12. In particular, each of claims 1, 6, and 18 recites “search-independent processing.”

Here, although the language of claims 1, 6, and 18 differs from the language of claim 12 and the scope of claims 1, 6, and 18 should be interpreted independently of claim 12, Applicant respectfully asserts that the remarks provided above in regard to the rejection of claim 12 also apply to the rejections of claims 1, 6, and 18. Accordingly, Applicant respectfully asserts claims 1, 6, and 18 are patentable over Kaganoi, whether

alone or in combination with Kanakubo and/or Khanna, because Kaganoi does not teach or suggest search-independent processing, as recited in the claims.

Dependent Claims 2-5, 7-11, 13-17, 20, and 21

Claims 2-5, 7-11, 13-17, 20, and 21 depend from and incorporate all of the limitations of the corresponding independent claims 1, 6, 12, and 18. Applicant respectfully asserts claims 2-5, 7-11, 13-17, 20, and 21 are allowable based on allowable base claims. Additionally, each of claims 2-5, 7-11, 13-17, 20, and 21 may be allowable for further reasons, as described below.

In regard to claim 14, Applicant respectfully submits that claim 14 is patentable over the combination of Kaganoi and Kanakubo because the combination of cited references does not teach or suggest all of the limitations of the claim. Claim 14 recites “the second stage processing element is further configured to perform search-dependent processing using a result of the search of the first stage memory unit and a result from the search-independent processing to produce a search key” (emphasis added). In contrast, the combination of cited references does not describe search-dependent processing, as recited in the claim. In fact, the Office Action appears to disregard the limitations related to using the result of the search of the first stage memory unit and using the result from the search-independent processing. Even if Kaganoi were to describe some type of search-dependent processing because the block 16 uses a calculated memory address that is derived from the memory from the CAM 13, there is no discussion of using a result from search-independent processing in combination with the result from a search of a first stage memory unit. Therefore, the combination of Kaganoi and Kanakubo does not teach or suggest all of the limitations of the claims because Kaganoi does not teach using both a result from a search of a first stage memory unit and a result from search-independent processing to perform the search-dependent processing, as recited in the claim. Accordingly, Applicant respectfully asserts that claim 14 is patentable over the cited references because the cited references do not teach or suggest all of the limitations of the claim. Similar remarks are also applicable to independent claims 1 and 6.

CONCLUSION

Applicant respectfully requests reconsideration of the claims in view of the amendments and remarks made herein. A notice of allowance is earnestly solicited.

At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account **50-3444** pursuant to 37 C.F.R. 1.25. Additionally, please charge any fees to Deposit Account **50-3444** under 37 C.F.R. 1.16, 1.17, 1.19, 1.20 and 1.21.

Respectfully submitted,

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